

Nebraska's Prairie Grouse: Abundance, Production and Their Historical Drivers



Danielle J. Berger, John P. Carroll, Larkin A. Powell

School of Natural Resources, University of Nebraska-Lincoln, Lincoln, NE 68583 USA

Jeffrey J. Lusk, Nebraska Game and Parks Commission, Lincoln, NE 68503, USA



History

Prior to settlement, prairie chickens occurred on true prairie grassland in southeast Nebraska (Figure 1).

By 1865 prairie chickens had spread into northeast and southwest Nebraska and were reported numerous throughout this area.

From 1865-75 Aughey reported a noticeable decline in prairie chicken numbers.

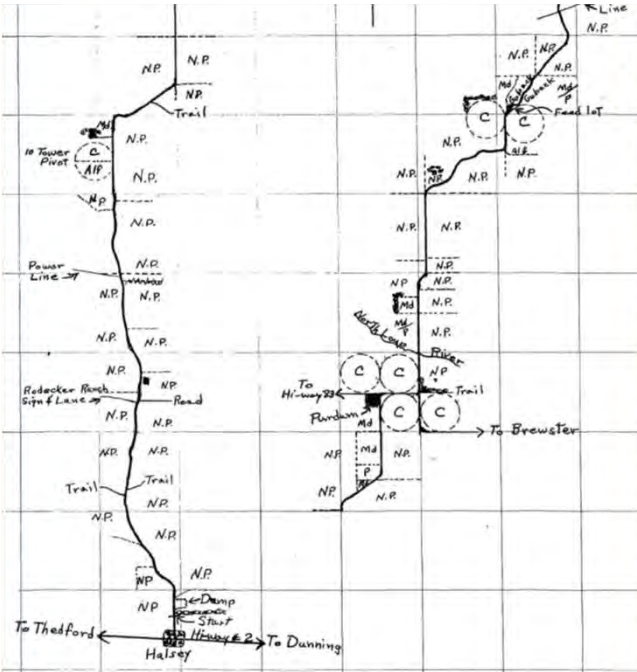
During the drought years of the late 1880's and early 1890's, a further decline was recorded.

Market hunting practically ceased by 1920.

Abundance and Production Indices

Breeding Ground Survey Route Data

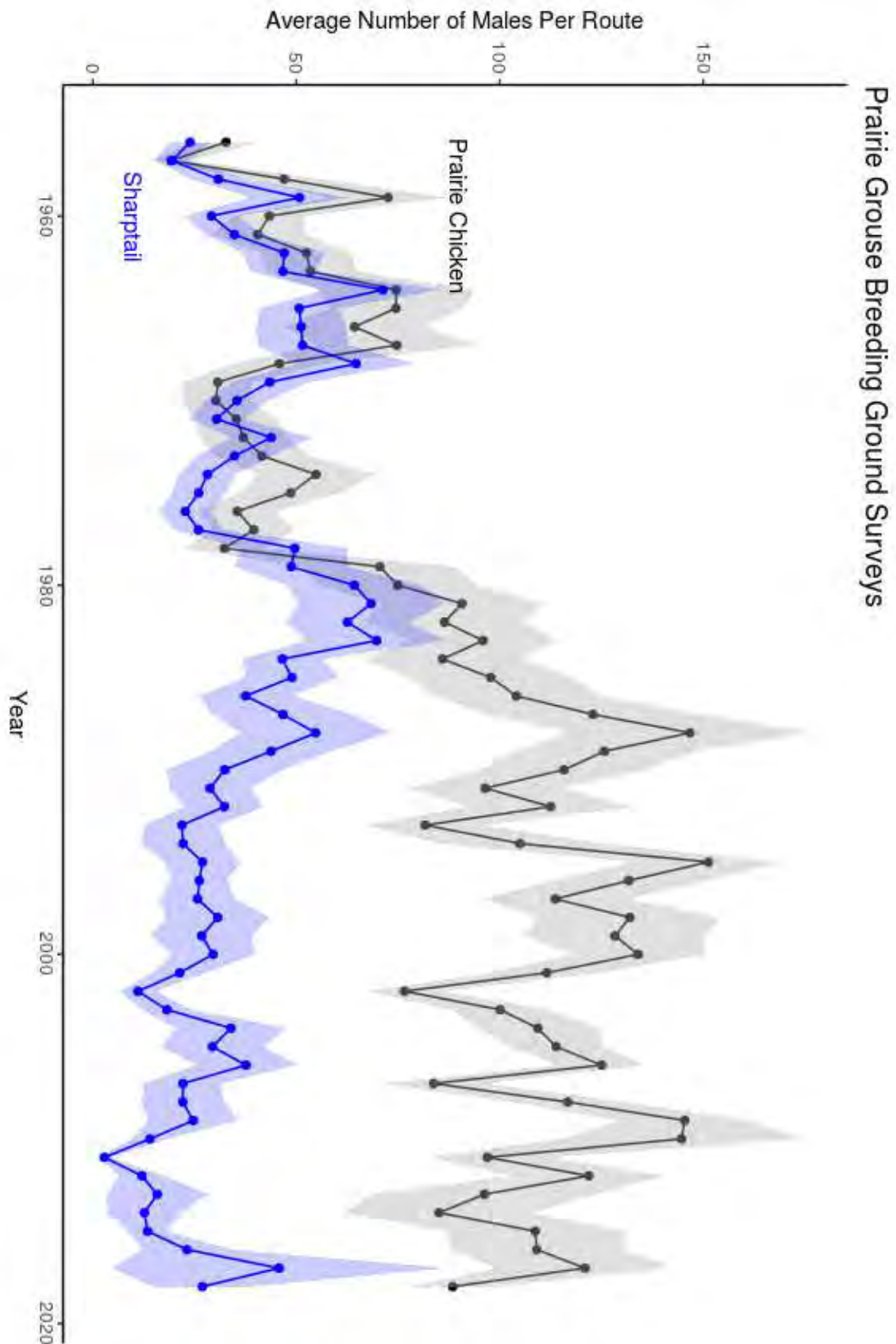
- 1956-Present
- 38, 20-mile routes run in late April by NGPC
- 20 stops per route
- Listen for leks the first day
- Walk out to leks, observe and count males on the second



Wing Ratio Data

- Juveniles per 100 adults from harvest data
- Four pooled sources
 - Hunting check station data (1950-1978)
 - Cooperator harvest data (1968-present)
 - Refuge/National Forest data (1979-present)
 - Sharptail Shootout data (1999-present)

Abundance: Increasing or Decreasing?



Prairie Chicken Populations are Increasing!

100/100 trials
are increasing



Sharptail
Populations
may be
Decreasing!

55/100 trials
are decreasing

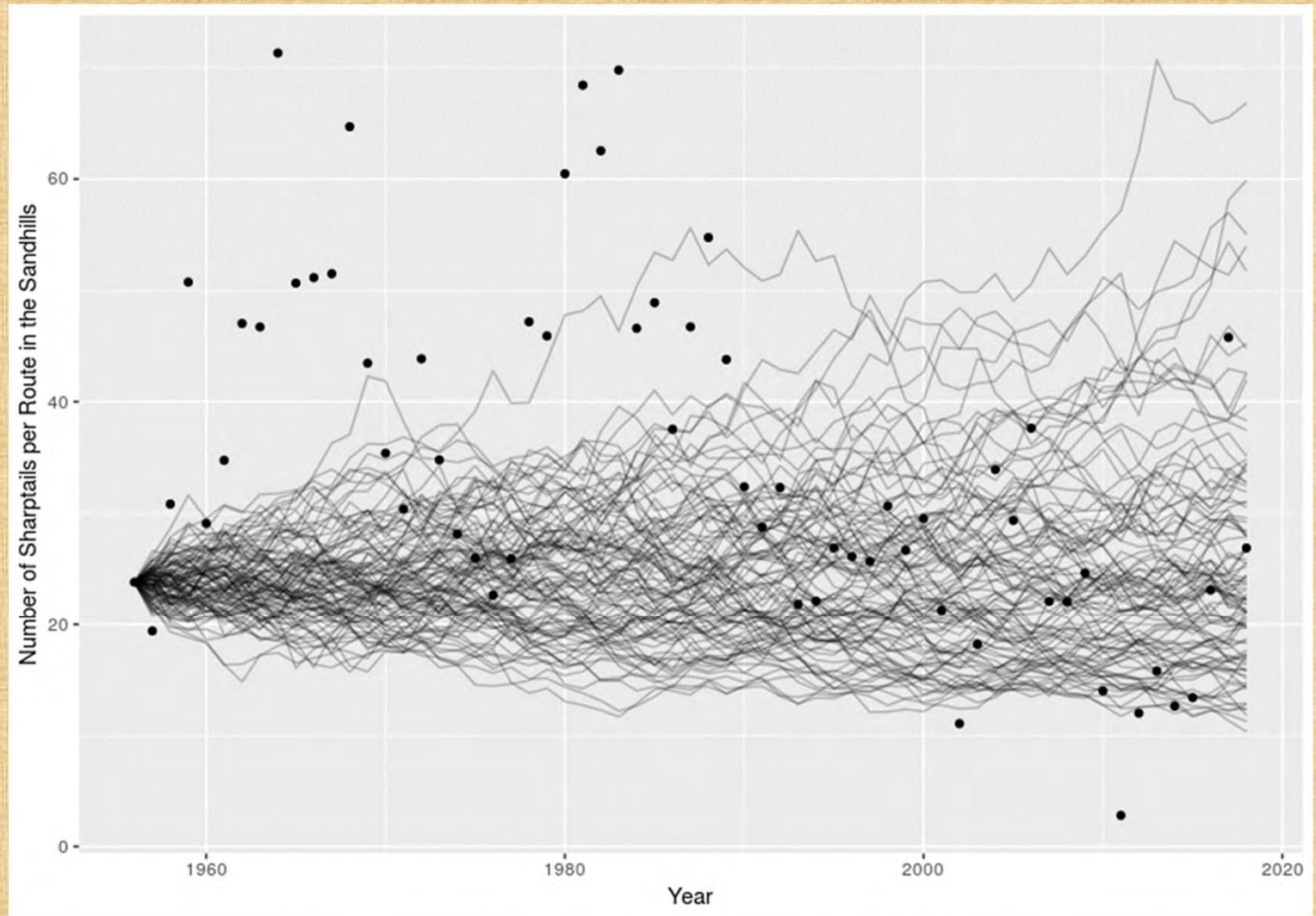


Figure 1. Prairie Chicken Nesting Range, 1960

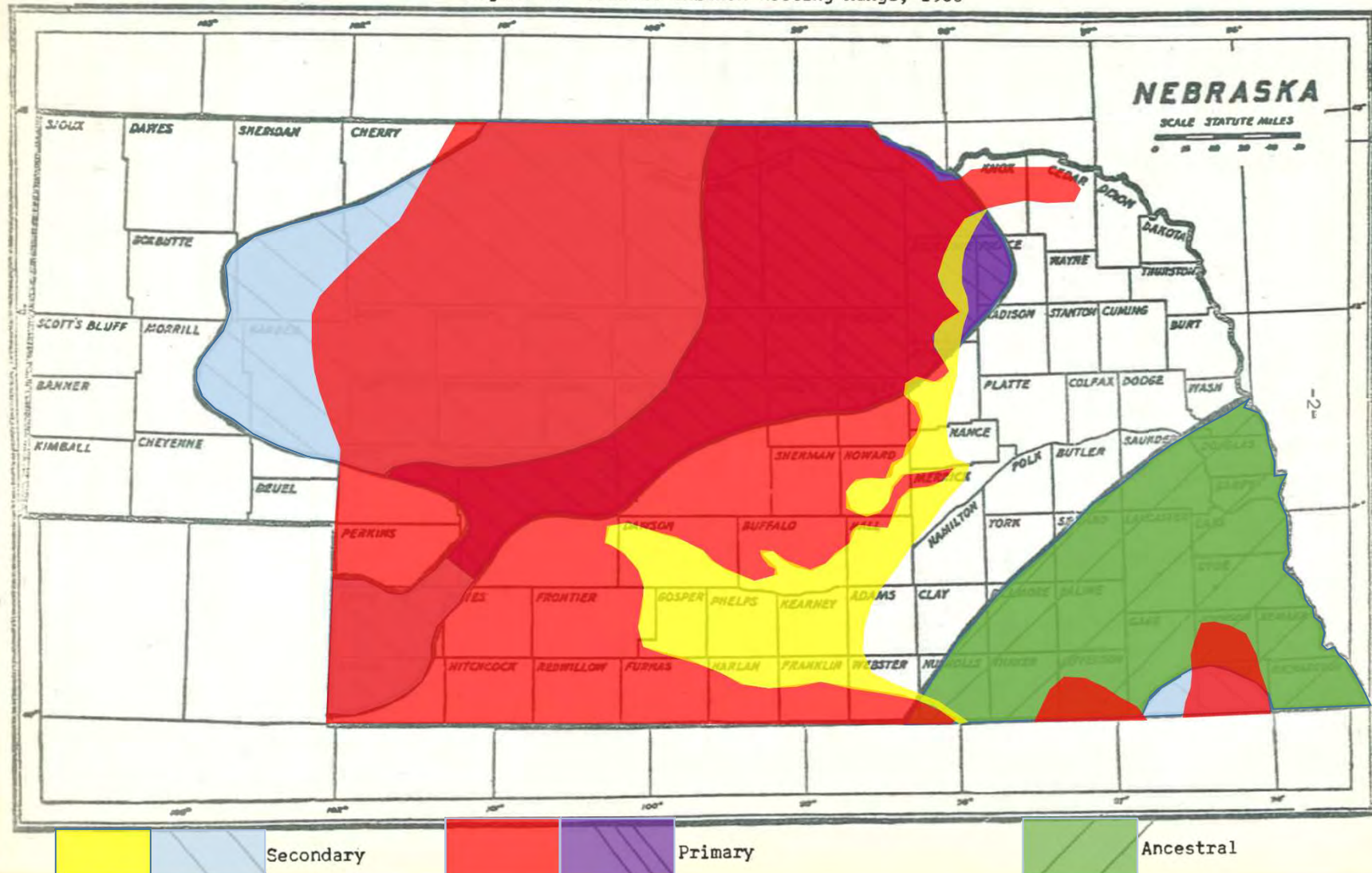


Figure 2. Sharp-tailed Grouse Nesting Range, 1960

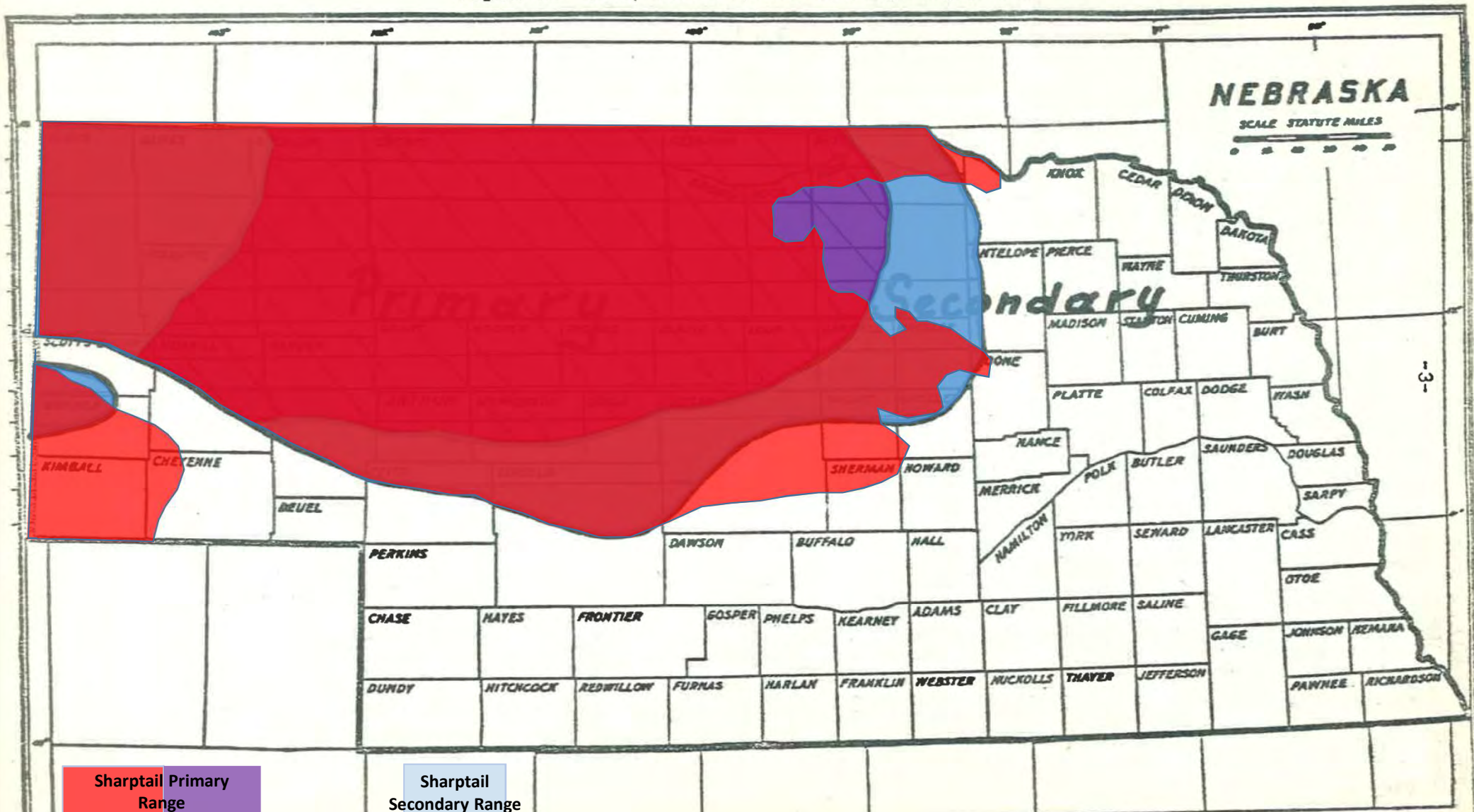
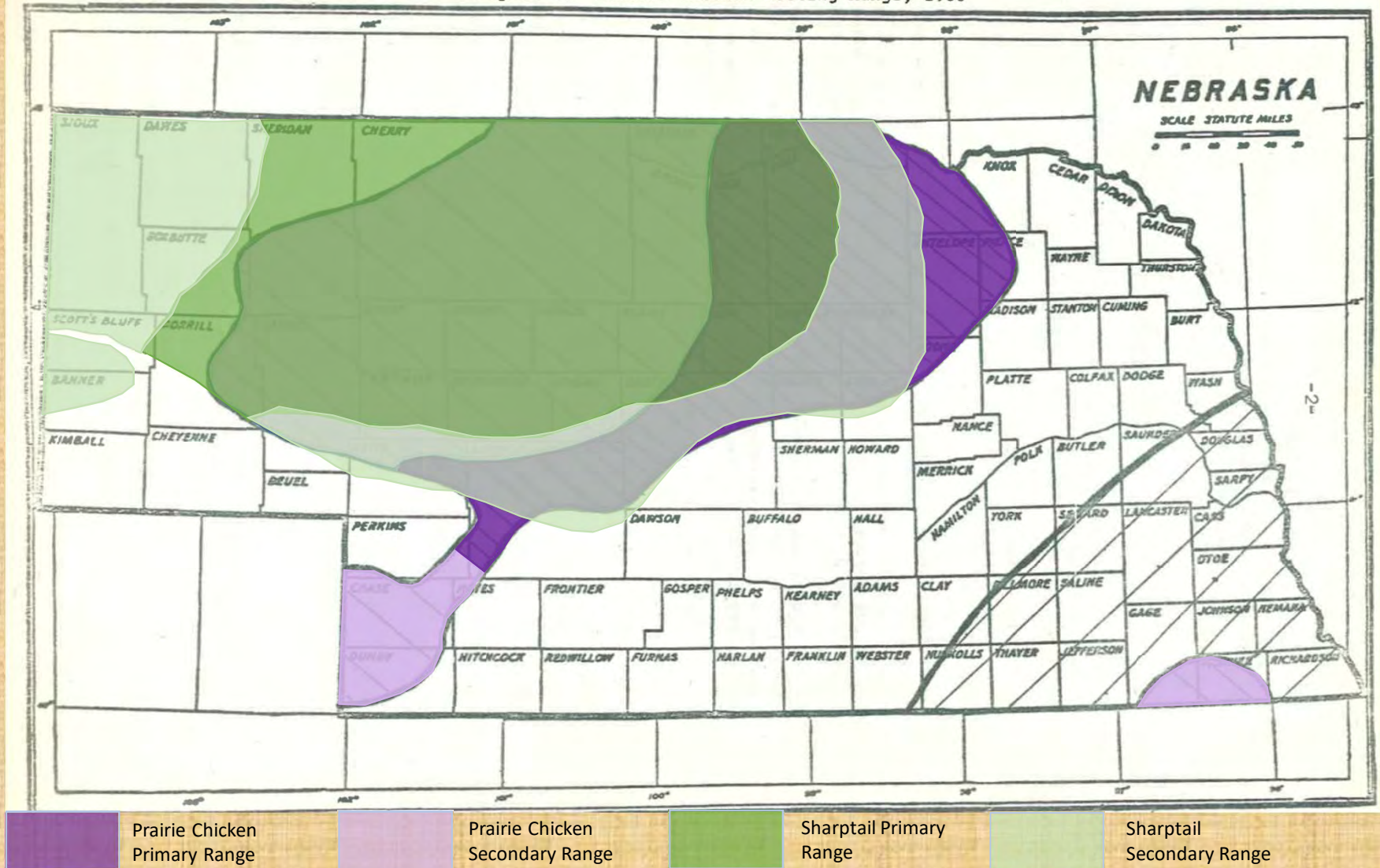
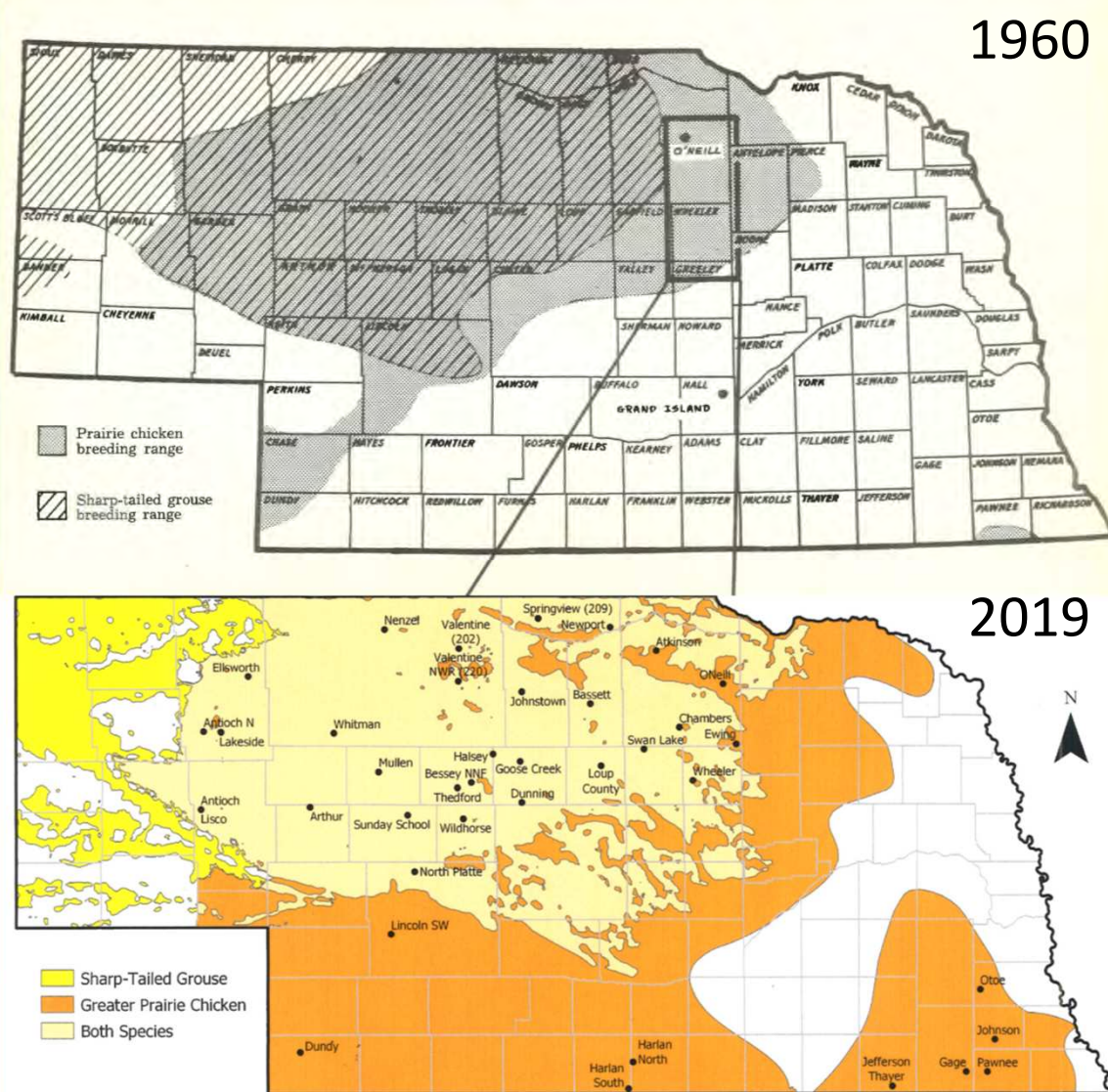


Figure 1. Prairie Chicken Nesting Range, 1960





- Lek count indices for a year are calculated as an average number of males per route across all routes where the species has ever been detected surveyed that year
- Range shifts may cause artificial changes in the lek count index if route locations don't follow spatial shifts of the population
- Sharptail populations may be decreasing or their core range may have shifted west to areas where little monitoring data is collected

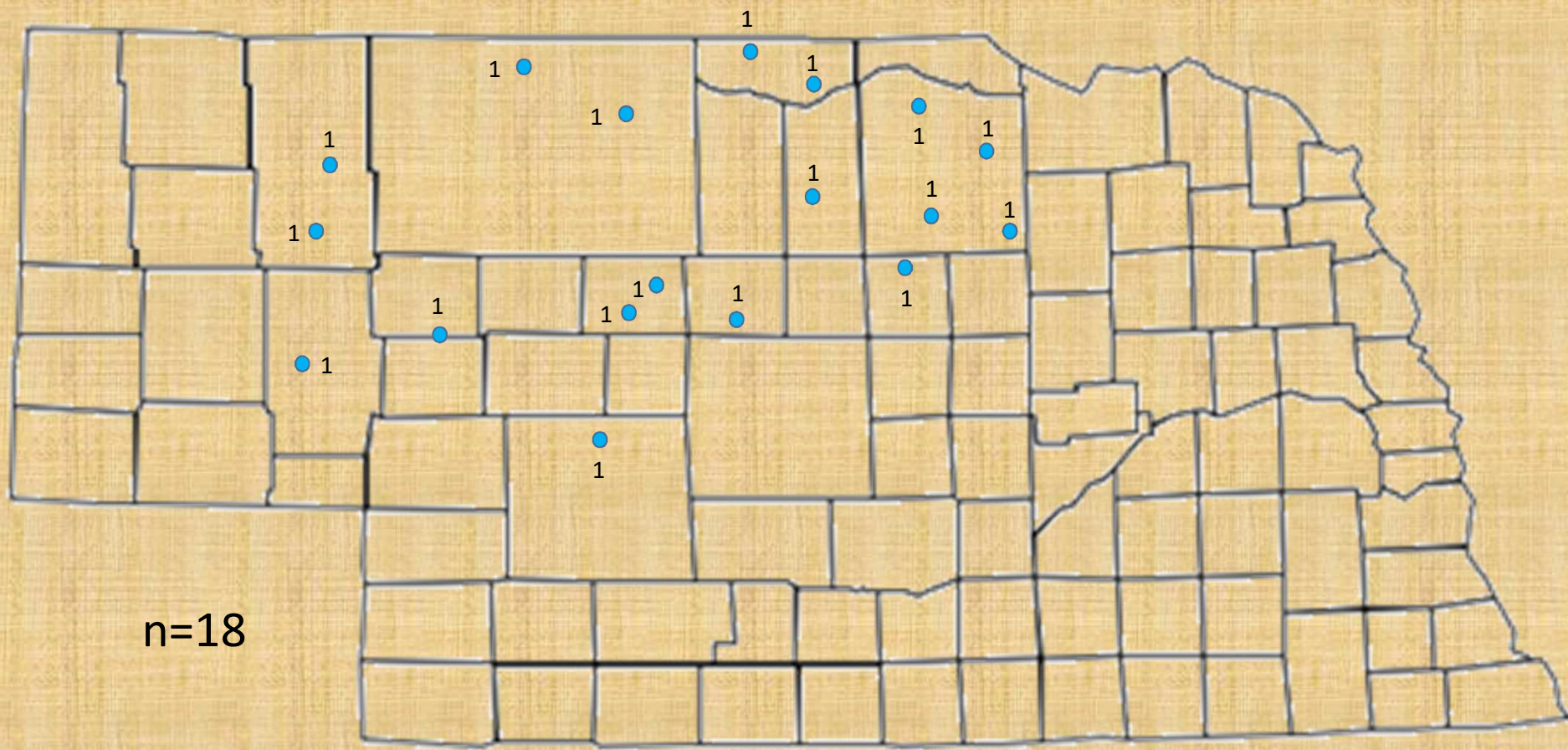
Historical NGPC Routes

- Male Count Data going back to 1956

N=38

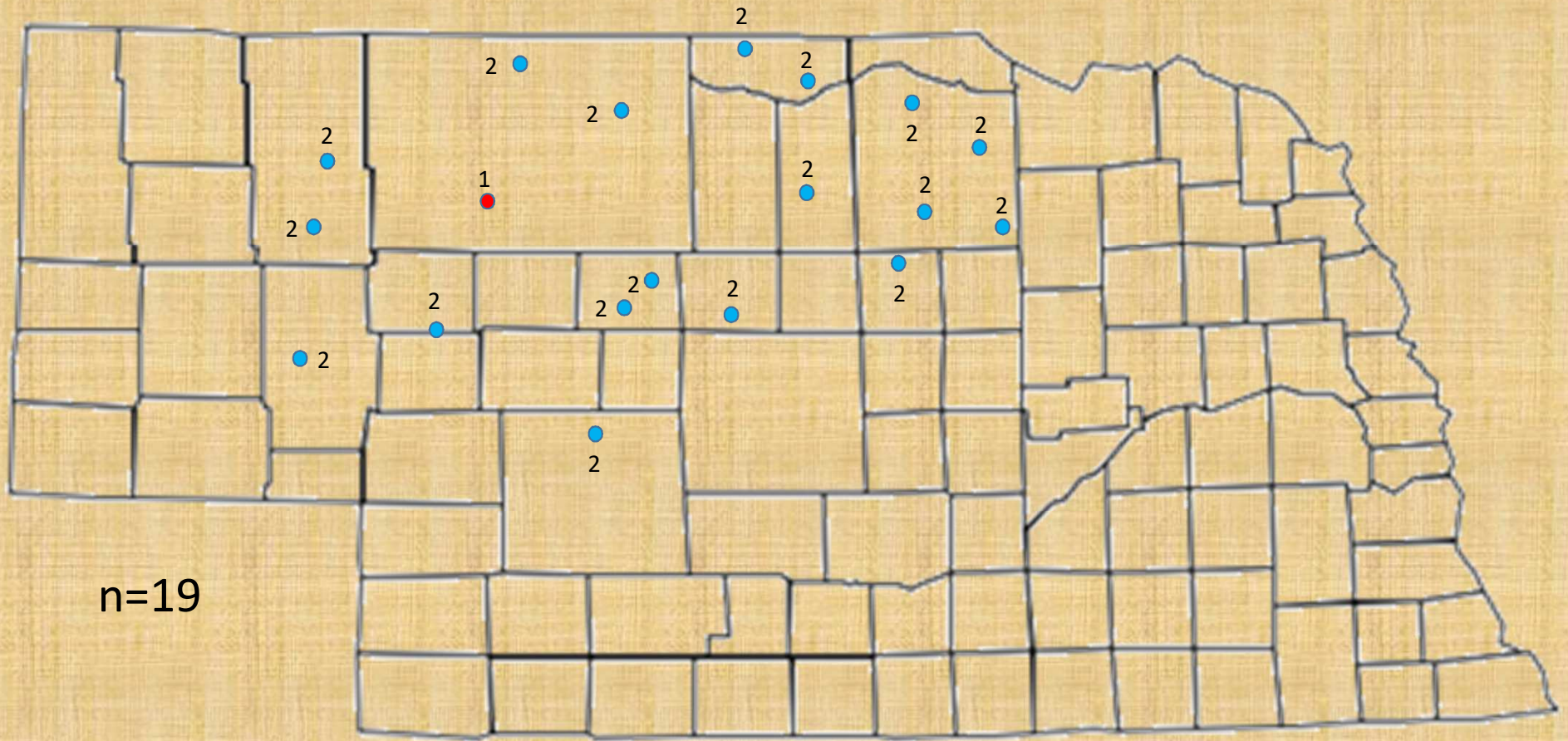


Routes 1950-1959



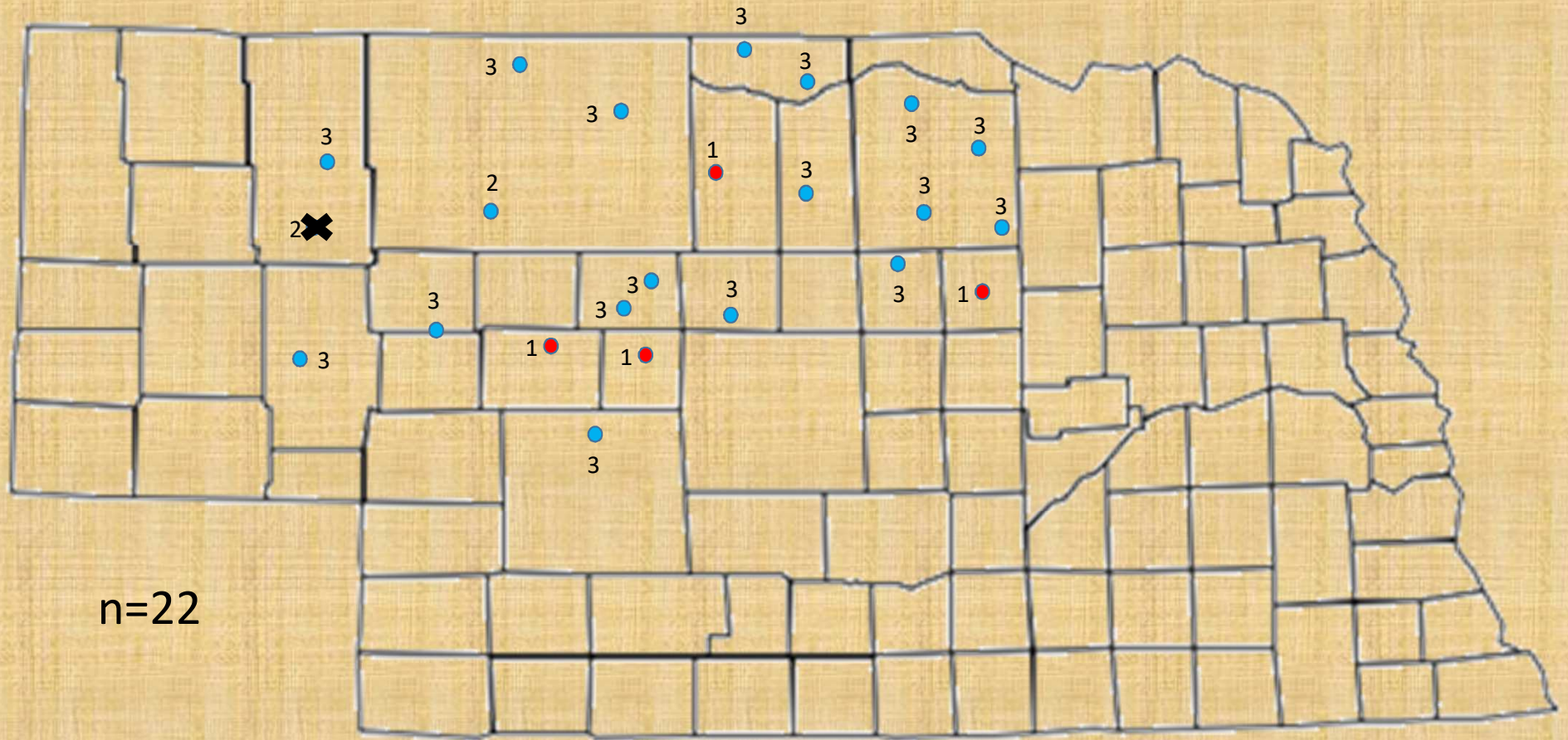
*Numbers next to routes indicate cumulative number of decades data is available for a route

Routes 1960-1969

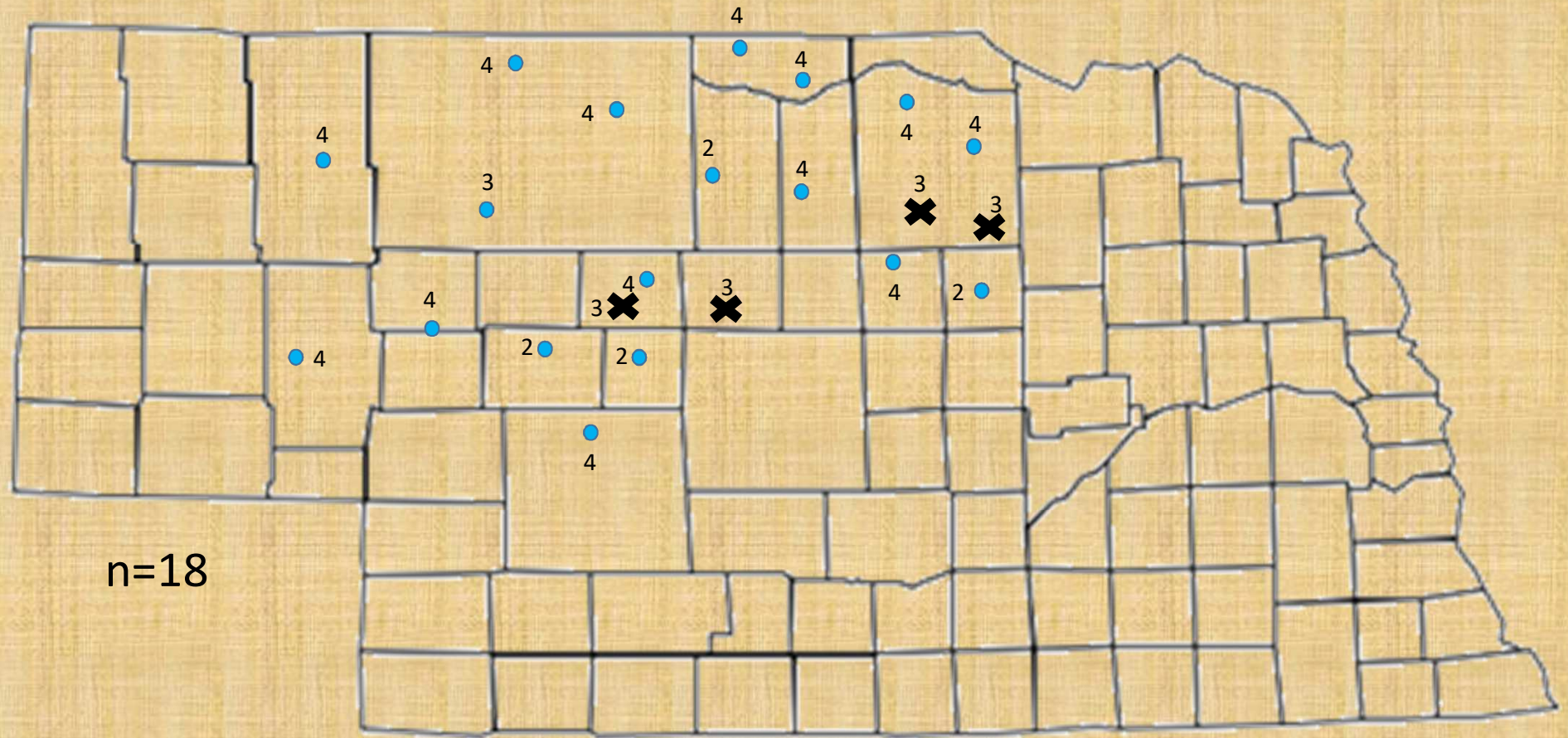


n=19

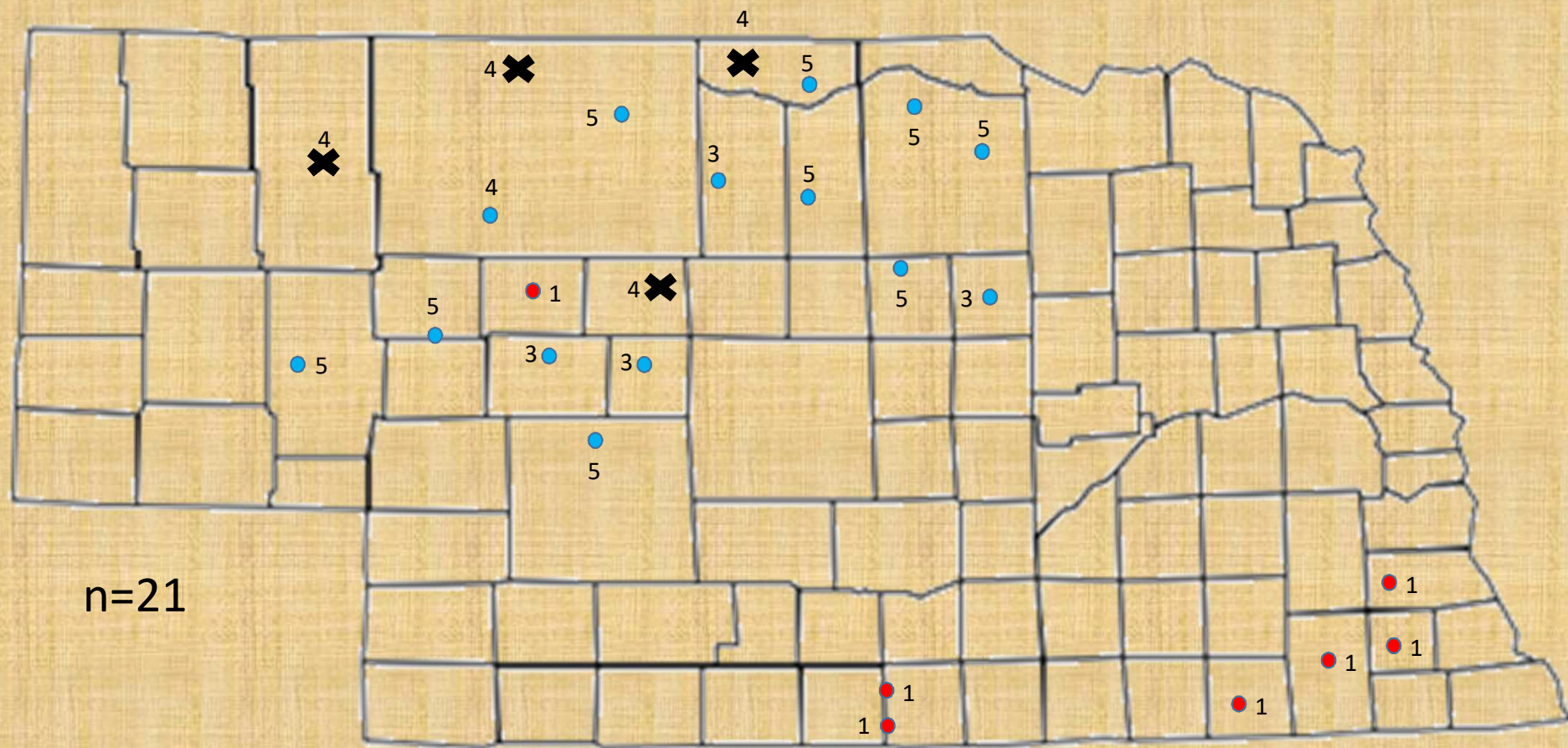
Routes 1970-1979- New routes added in 1978



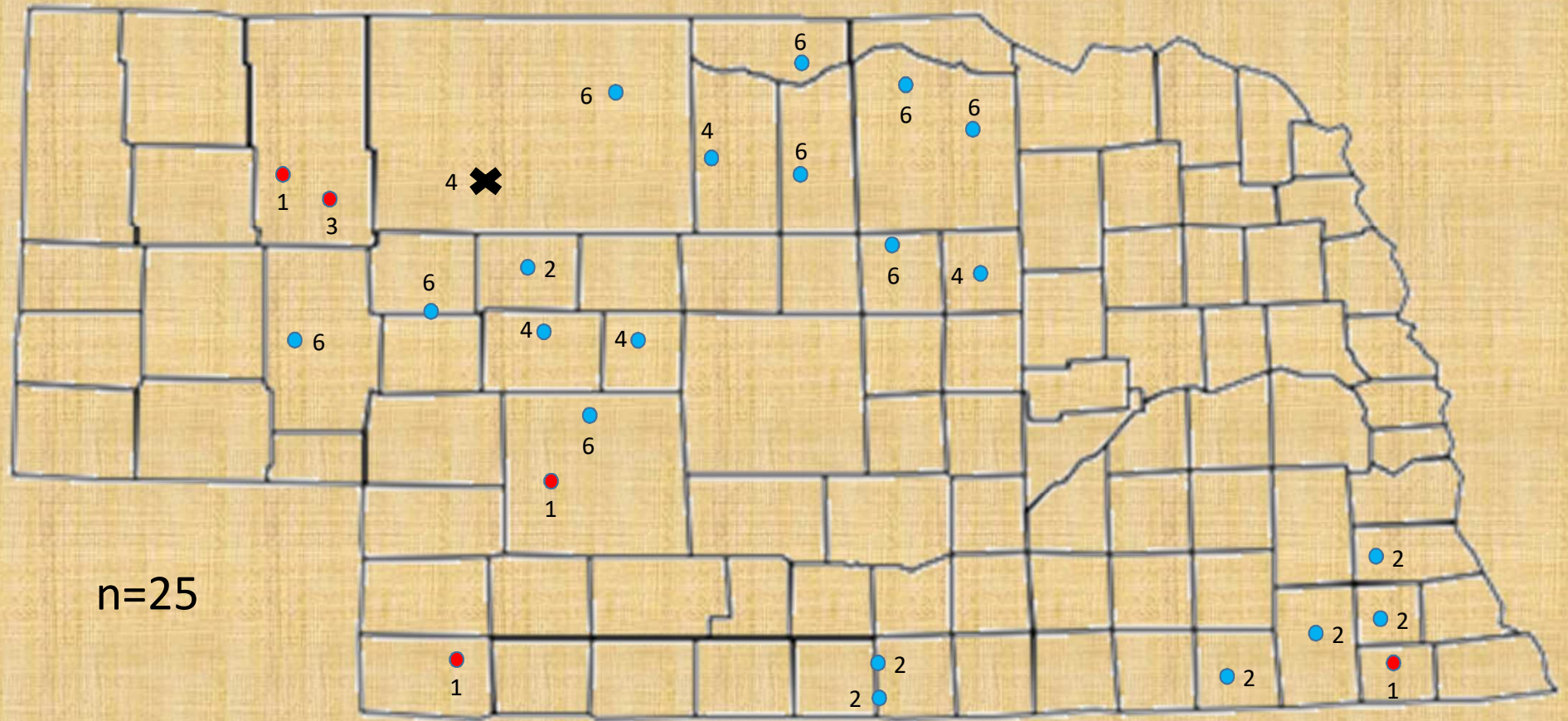
Routes 1980-1989



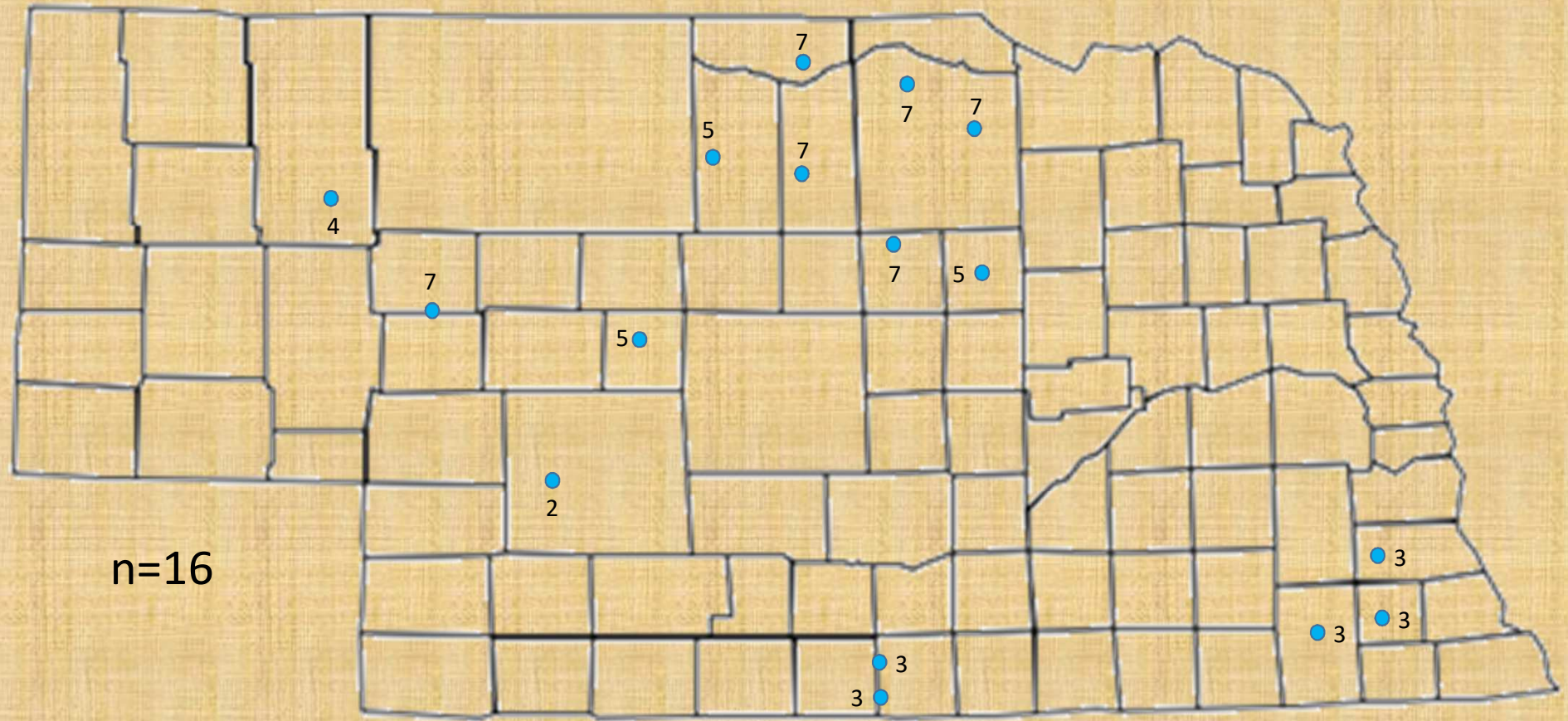
Routes 1990-1999- Southeast monitoring begins in 1996



Routes 2000-2009

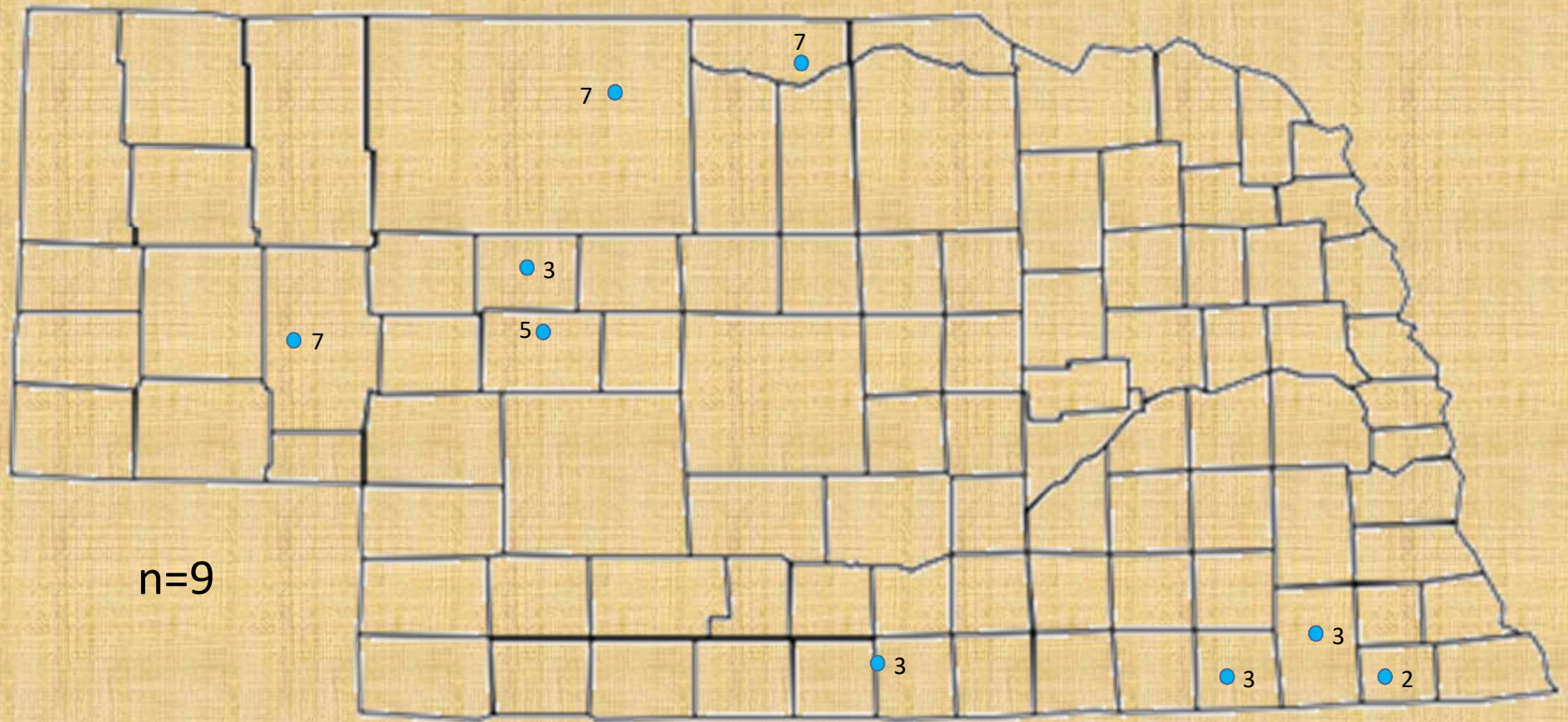


Routes 2010-Present, Even-year rotation

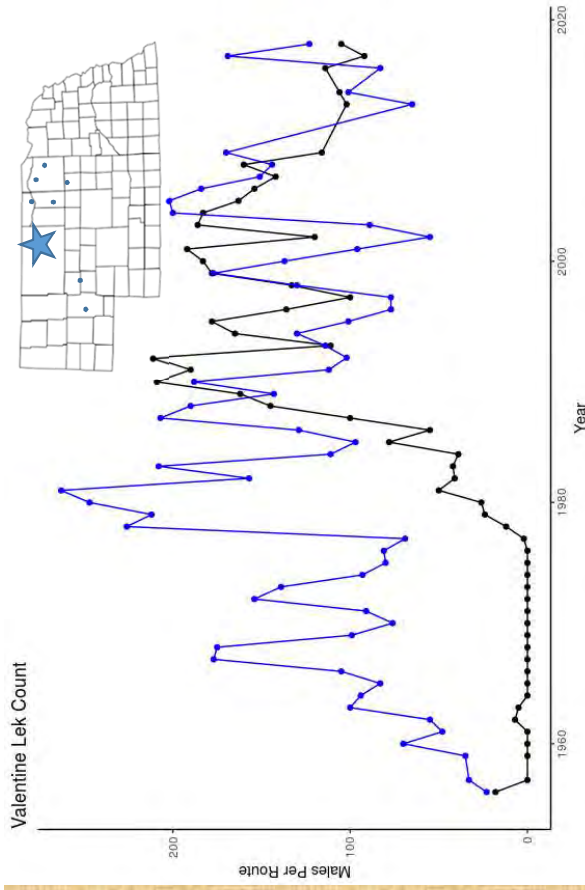


n=16

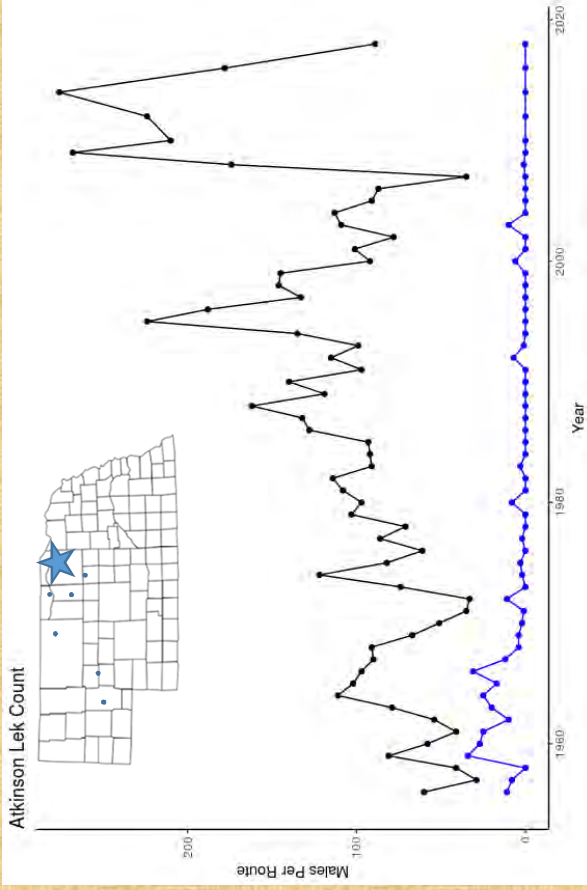
Routes 2010-Present, Odd-year rotation



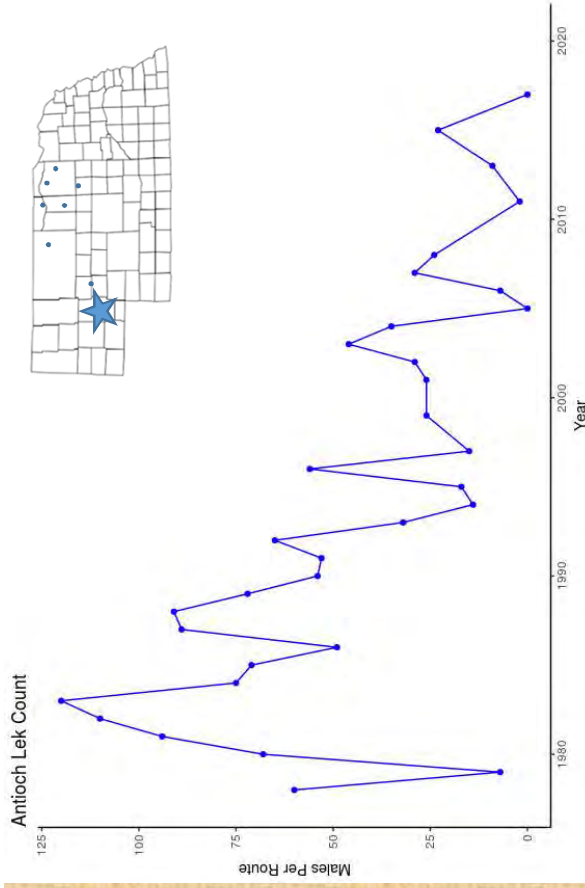
North Central



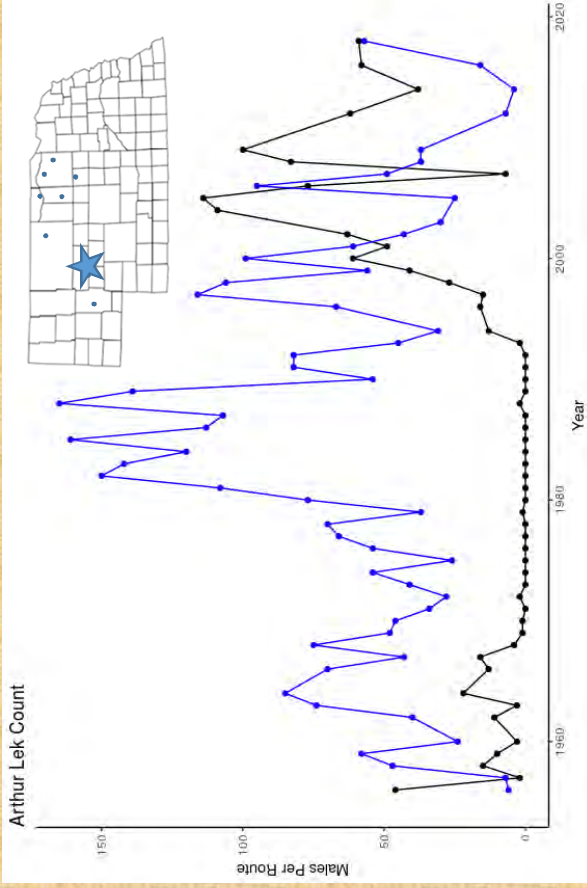
East



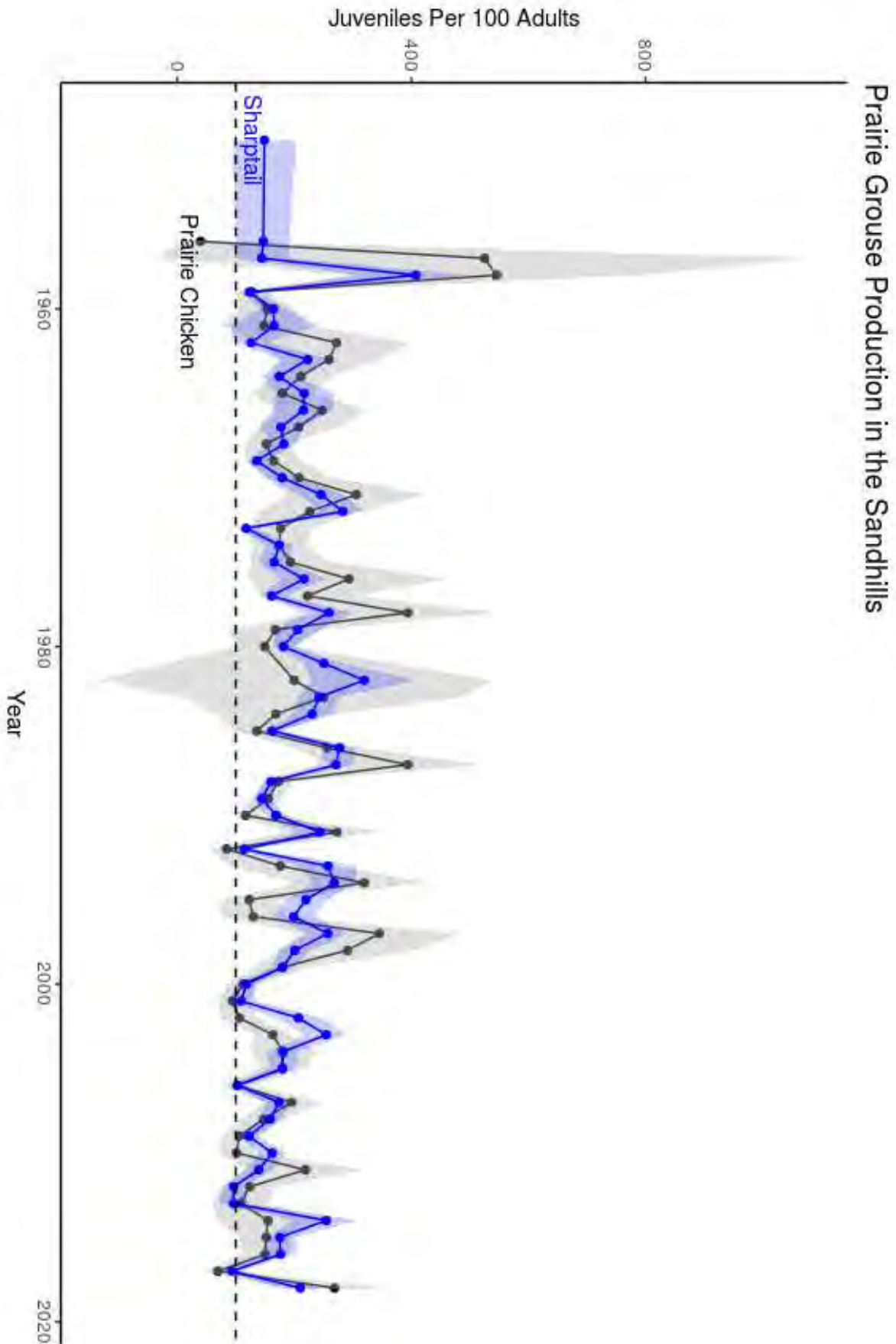
Farthest West



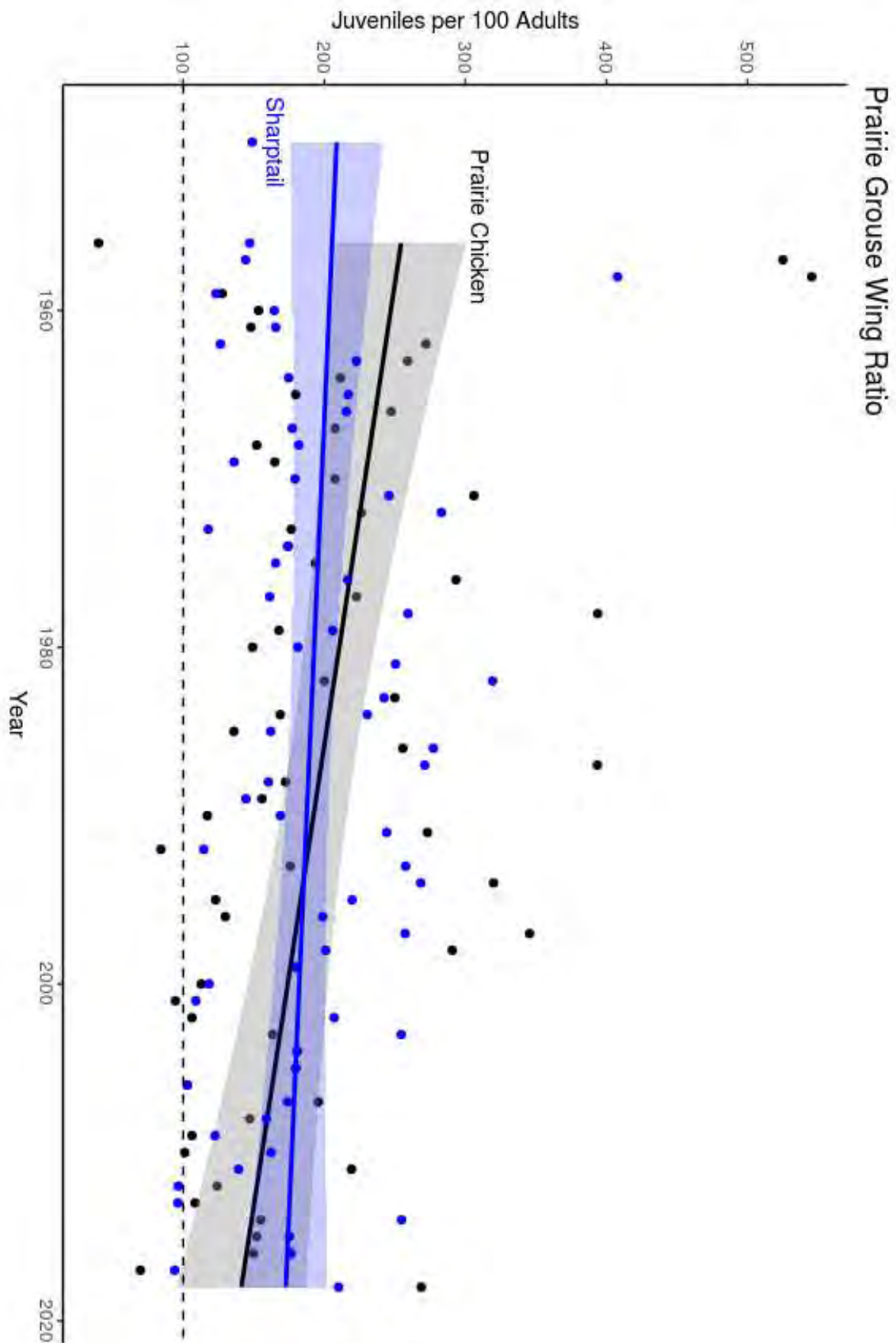
West



Production: Increasing or Decreasing?



Production: Increasing or Decreasing?



Population Drivers: Land Use Change?

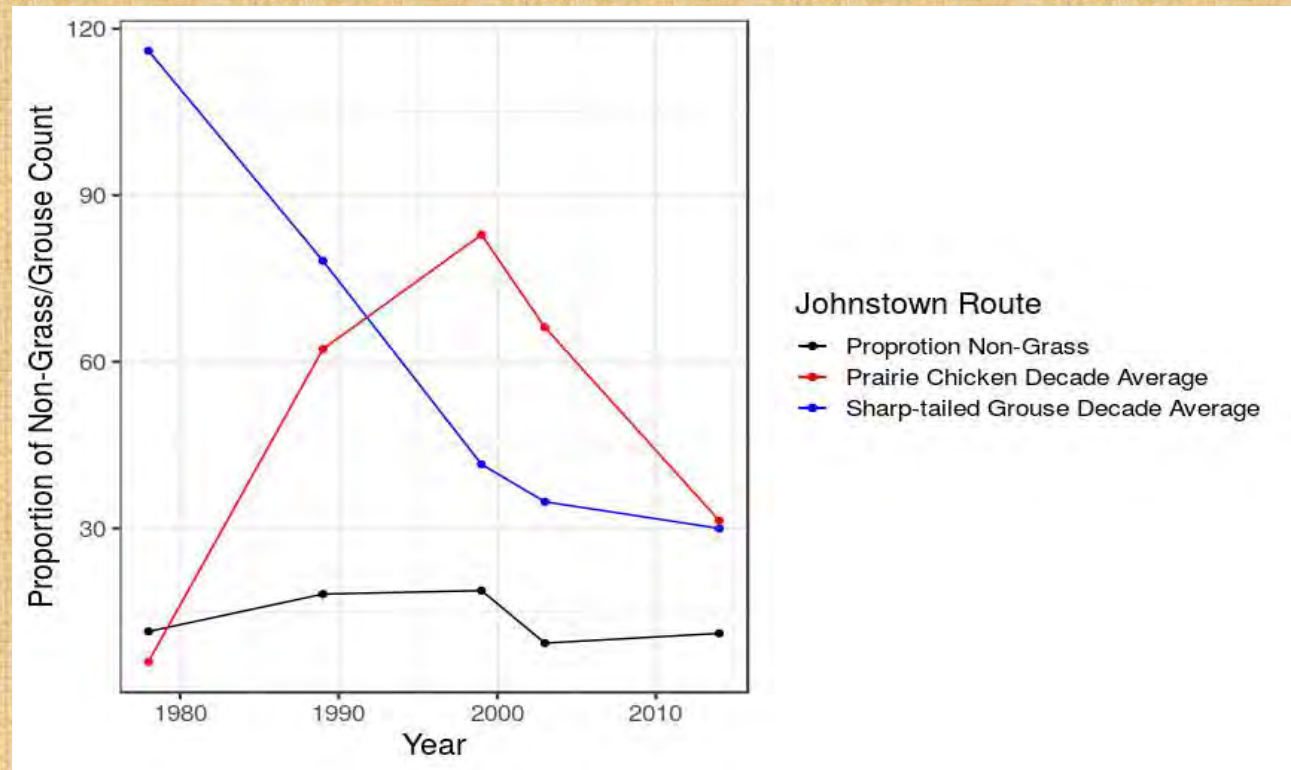
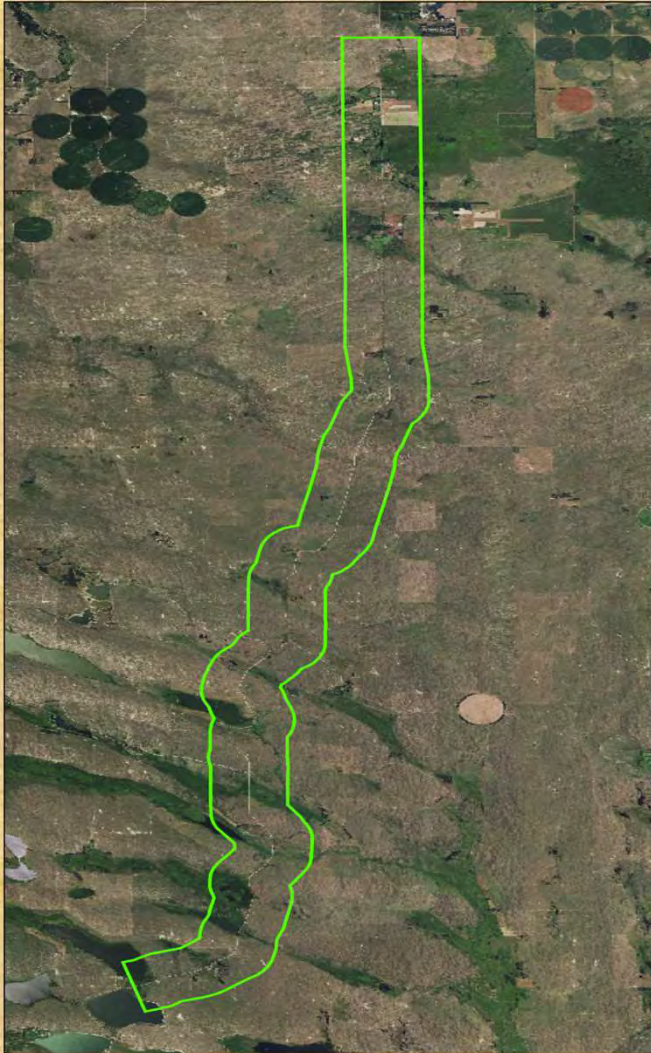
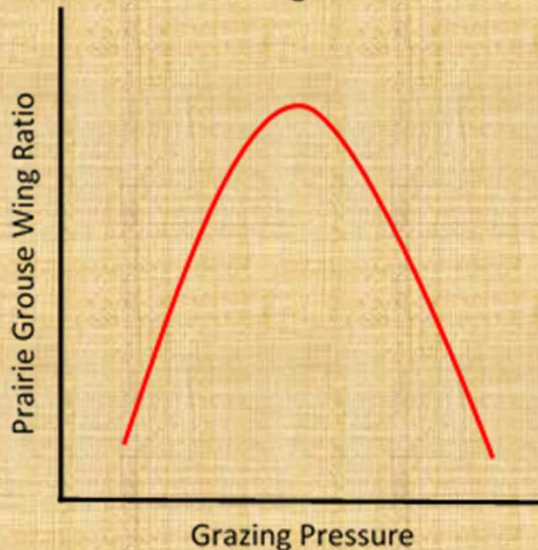
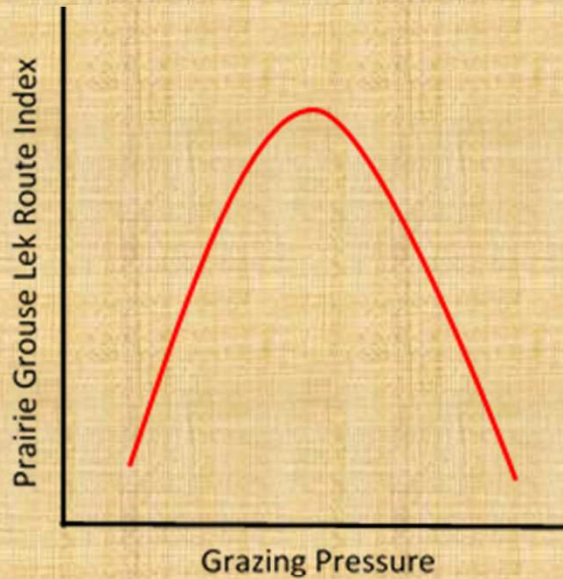


Figure 1. Changes in percent non-grass area and prairie chicken and sharp-tailed grouse counts with counts averaged across each decade from 1970 until 2018.

Figure 2. Johnstown breeding ground survey route buffered by ½ mile to encompass all land area surveyed, Brown County, NE.

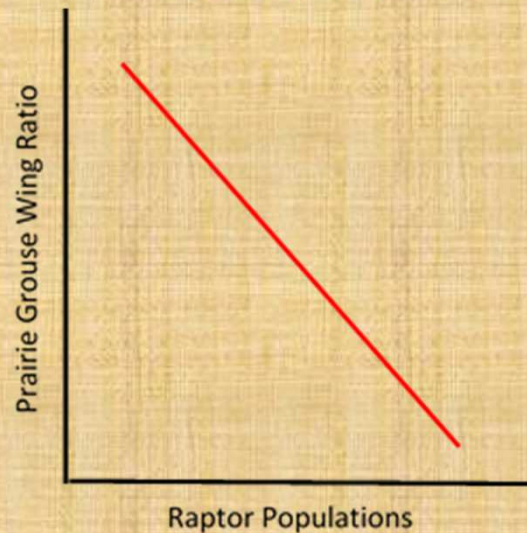
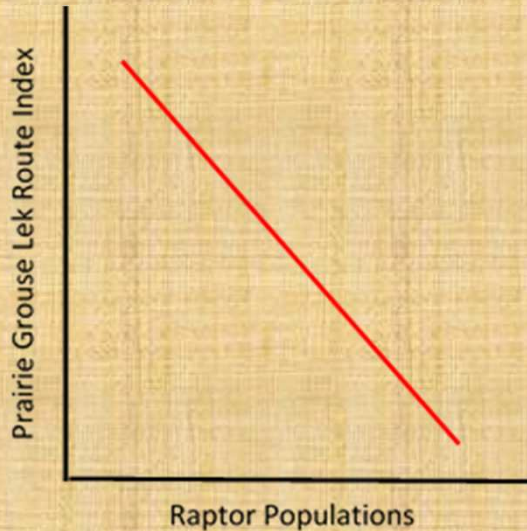
Population Drivers: Grazing Pressure?

- NASS data- Cow-calf pairs + Replacement Heifer Calves + Replacement Heifer Yearlings + Bulls + Backgrounders=Grazing Cattle
- Each NASS cattle category is multiplied by an AUM factor based on average weight to approximate grazing demand and divided by total area grazed in the Sandhills
- Adjusted for change in cattle weight and grazing season length over time
- NDVI may serve as a substitute index because it is a better spatial approximation of grazing intensity spatially



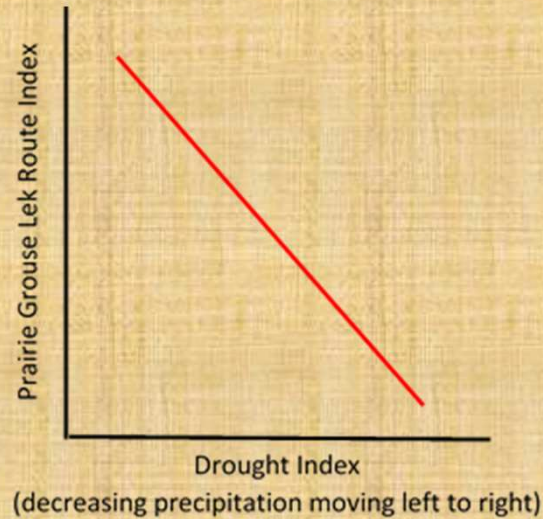
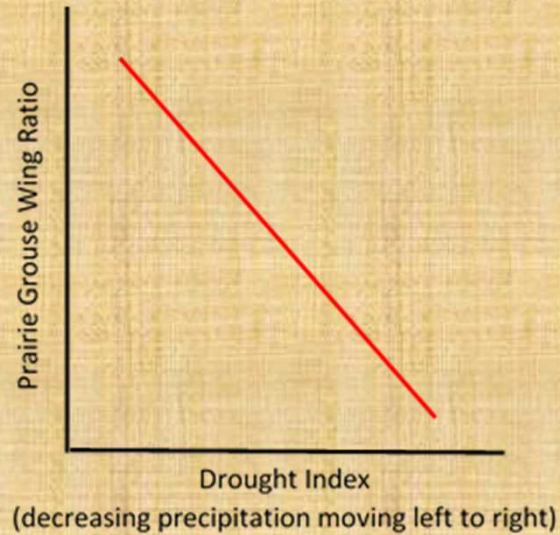
Population Drivers: Bird of Prey Populations?

- Use de-trended BBS data from red-tailed hawk, great horned owl, northern harrier and Swainson's hawk as an index of raptor populations
- Populations of generalist raptors, like red-tailed hawks, have increased in human-modified landscapes
- Raptor predation reduces prairie grouse nest success and adult survival
- Predation effects likely worsen in the absence of adequate cover resulting from increasing grazing pressure, land use change and drought



Population Drivers: Drought?

- Use the Palmer drought severity index





Acknowledgements

Our project was funded by the Nebraska Game and Parks Commission through a Wildlife Restoration Grant.



A very special thanks to all of the Nebraska Game and Parks, USFWS, and US Forest Service staff, hunters and volunteers whose efforts have contributed to the collection and compilation of historical prairie grouse data for the state of Nebraska.

Extra thanks to Bill Vodehnal who had the foresight to save all of the old paper documents that made my research efforts possible and who sorted through the dusty boxes and filing cabinets with me to find this data.

Thank you to my advisers Larkin Powell and John Carroll for tolerating my endless questions and late night emails and still being willing to offer their endless support.

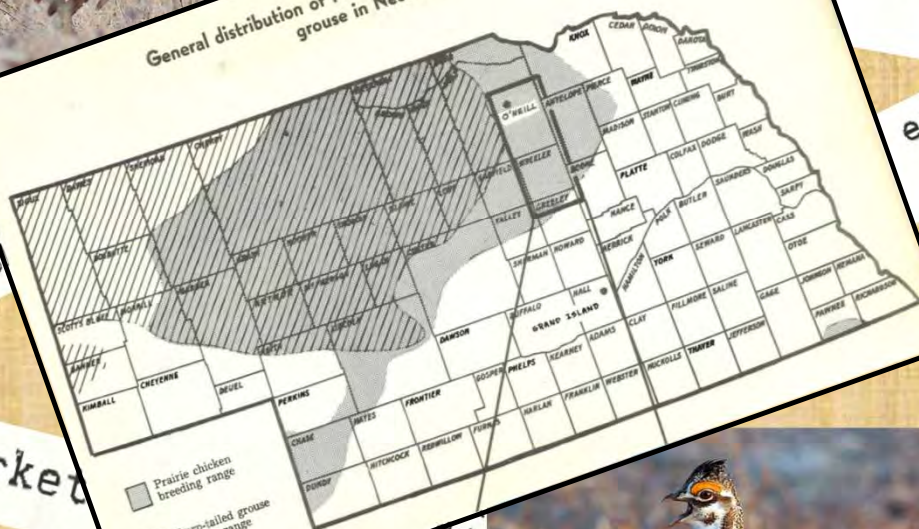
And thanks to the UNL School of Natural Resources for supporting my research by offering me the opportunity to teach and to the Sampson Fellowship for financial assistance to explore grazing-related questions.





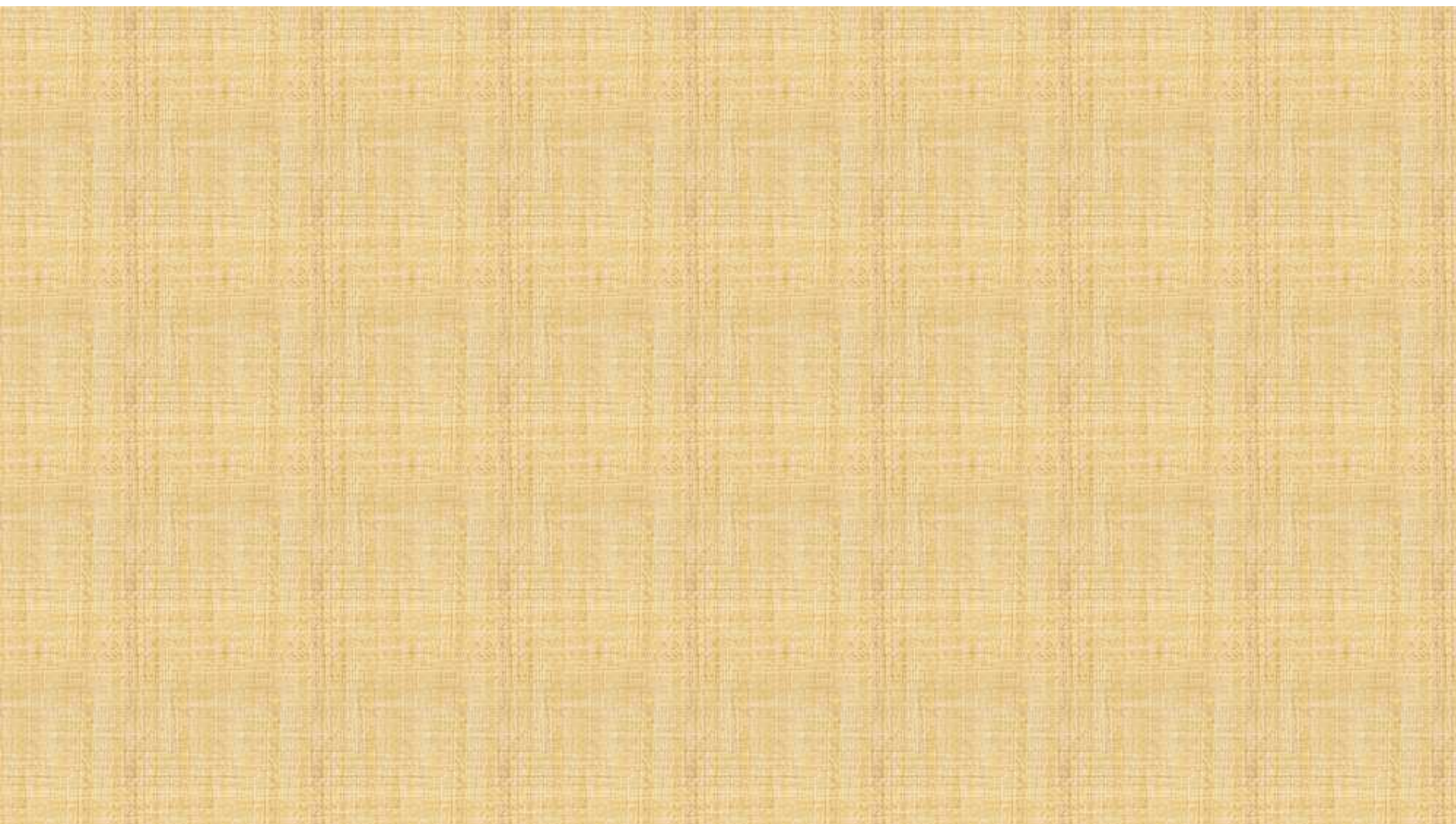
History

General distribution of Prairie chicken and Sharp-tailed grouse in Nebraska



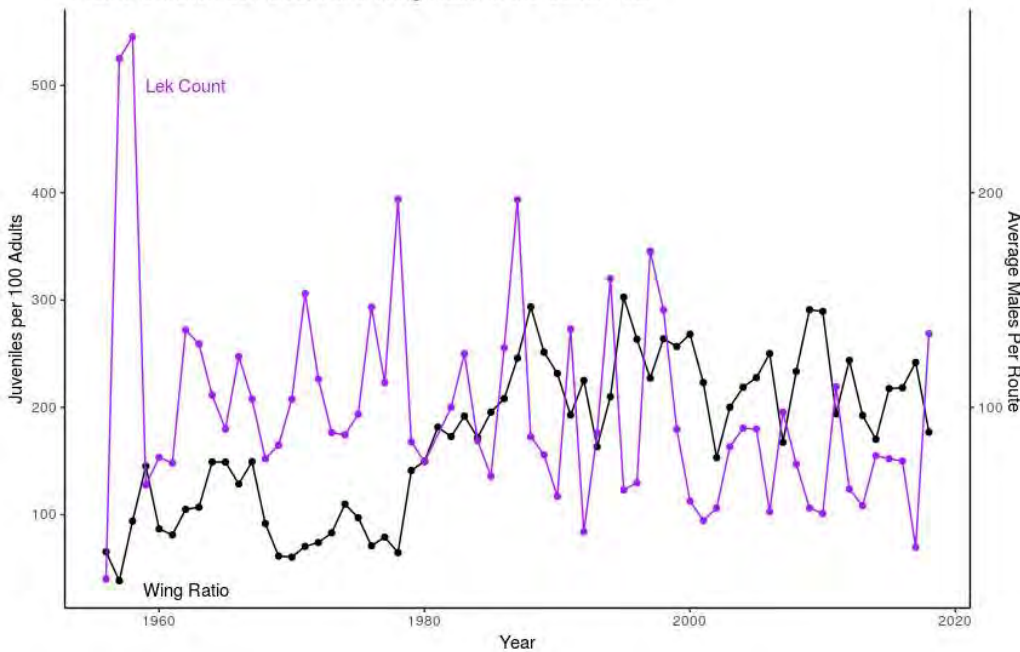
Questions?

From 1865-75 Aughey re
chicken numbers.

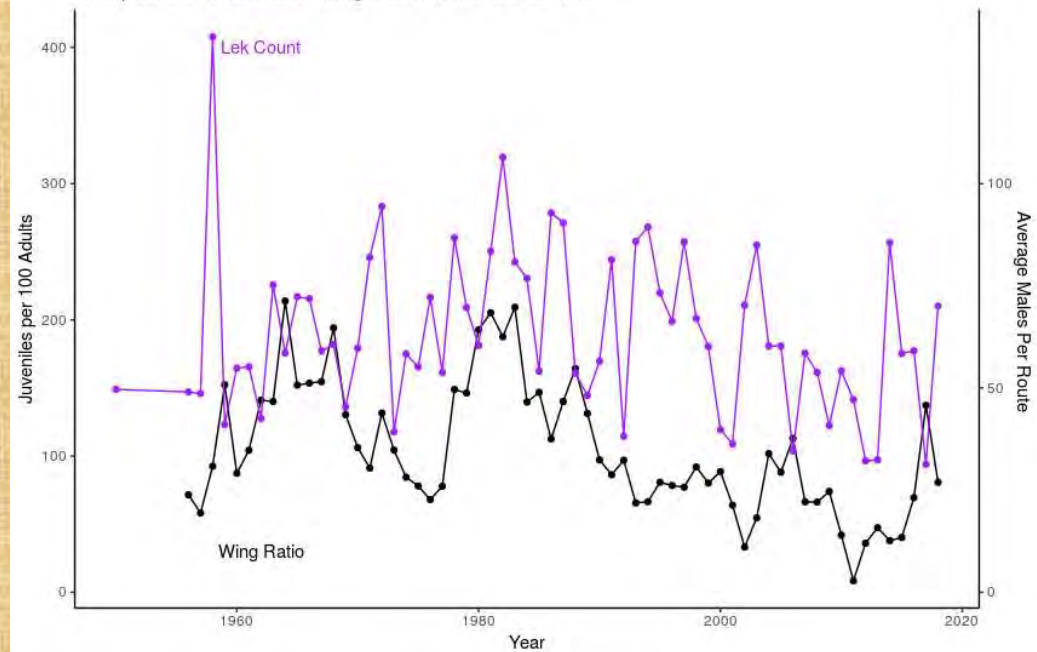


Do High Spring Counts Translate into High Fall Production?

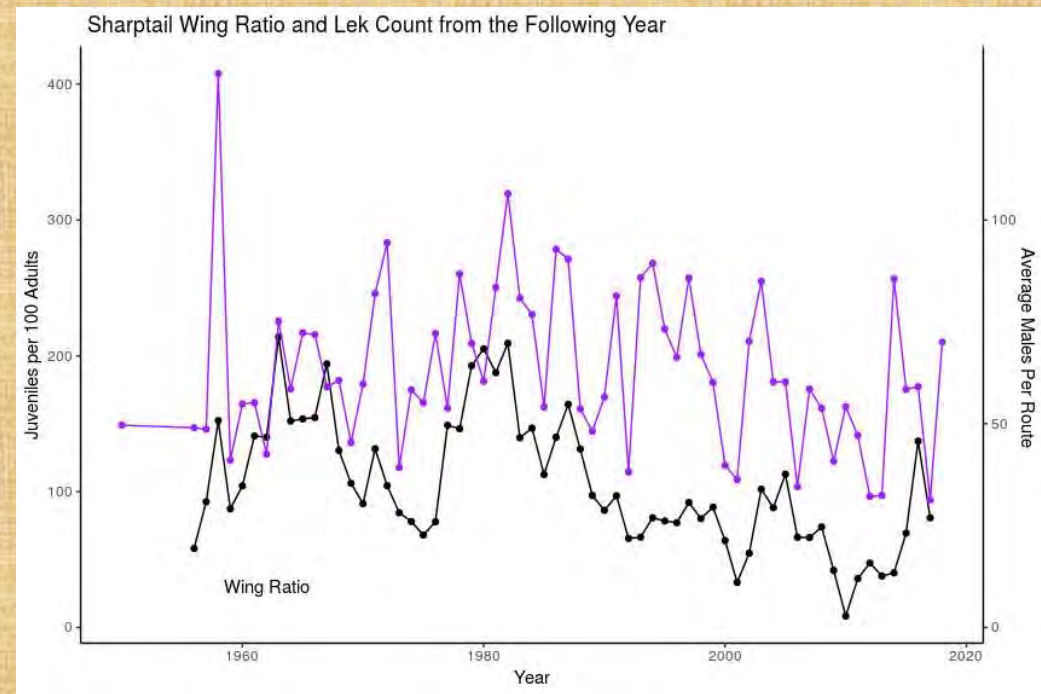
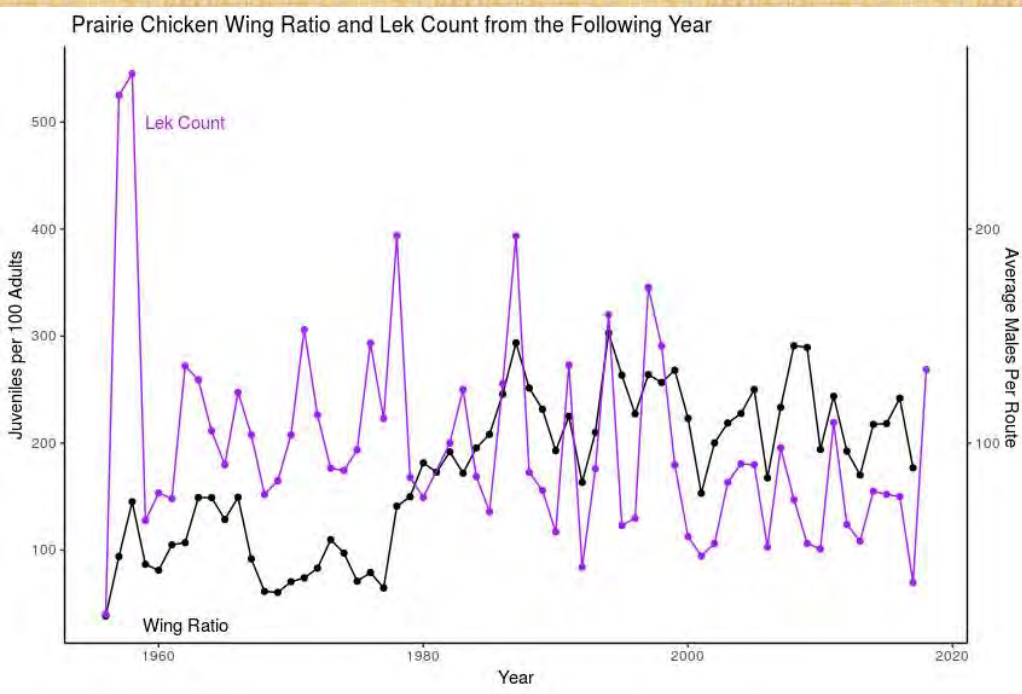
Prairie Chicken Lek Count and Wing Ratio In the Same Year



Sharptail Lek Count and Wing Ratio In the Same Year



Does High Fall Production Translate into a High Lek Count the Following Spring?



Routes with Seven Decades of Data

